Deutsche Power
Uninterruptible Power Supply

Elektra + Series

Online Double Conversion UPS

(1 KVA ~ 10 KVA)

Unity Power factor

USER MANUAL

INTRODUCTION

Thank You for choosing Deutsche Power UPS product. It is designed for a safe and reliable usage and minimal maintenance.

Before you start please read this manual. It contains instructions concerning a safe installation and operation of the UPS. It helps you to get the highest performance and to operate efficiently the UPS. This manual includes the construction of this UPS-system and related protection functions. It also describes how to contact your supplier's department when necessary.

Please keep to all the warnings and operation that are on the machine and in the manual. Please do not operate this UPS-System before you have read this manual.

The UPS is an Online Double Conversion Pure Sine Wave series. It is ideal for all kinds of consistent & Critical Loads.

It gives the connected equipment protection against all sorts of power problems; such as brownouts, blackouts, surges, lightning strikes and line noise. It contain state of art technology of Deutsche Power and is backed with it's highly caliber team.

The UPS can b used in a great Varity of applications.

Have a safe power as Deutsche Power provides the power of your company!!!

Table of Contents

1. INTRODUCTION

1. 1 Description of Commonly Used Symbols

Some or all of the following symbols may be used in this manual and may appear in your application process. Therefore, all users should read the form carefully and thoroughly.

Notation and Explanation			
Notation	Explanation	Notation	Explanation
	Alert you to pay special attention		Protective ground
	Caution of high voltage		Alarm silence
	Turn on the UPS		Overload indication
	Turn off the UPS		Battery check
	Idle or shut down the UPS		Recyclable
	Alternating current source (AC)		Do not dispose with ordinary trash
	Direct current source (DC)		Battery

1. 2 Safety Instructions

1. Read this manual carefully and thoroughly before operation the UPS and save this manual properly for future reference.
2. Do not tear up or shatter the alarm table on the UPS and pay attention to it.
3. Please do not overload the UPS.
4. The UPS contains large capacity batteries. The case of the UPS must not be opened by untrained personnel. Otherwise, it may cause electric shock.
5. Do not short the positive and negative electrodes of battery. Otherwise, it may cause electric shock or fire.
6. Do not plunge or insert any objects into the air vents and other inlets.
7. Do not store or use the device in the following environment:
   - Where there is inflammable gas, corrosive agents or heavy dust
   - Where the temperature is very high or low (above 40℃ or below 0℃) or the humidity is very high (more than 90%)
   - Under direct sunlight or close to heating facilities
   - Place of strong vibrations
8. In the event of fire occurring in the vicinity, please use dry powder fire extinguishers .The use of liquid fire extinguishing agents may cause electric shock.

HIGH-VOLTAGE DANGER

CAUTION: The battery circuit is not isolated from the input voltage. There may be a h azardous voltage between battery terminals and ground. Check and ensure that there are no voltages before touching.

CAUTION: Even after disconnect from the line voltage, components inside the UPS are still connected to the battery and are potentially hazardous. Disconnect the battery circuit before implementing service or maintenance work.

2. PRODUCT DESCRIPTION

The Elektra-series is an on-line uninterruptible power supply device incorporating double-converter technology with single-phase input and single-phase output. It offers the high quality power supply with the greatest degree of availability and reliability. The Elektra Series Single Phase is compact and convenient for users, especially for the basic equipment's in some areas such as: finance, communication, government, traffic, manufacture, education and so on.

2. 1 System Type and Configuration

There are two types of UPS according to the battery configuration: standard type and long backup time type, each available in the following ratings: 1kVA, 2kVA and 3kVA UPS.

Table 2-1 UPS types and configurations

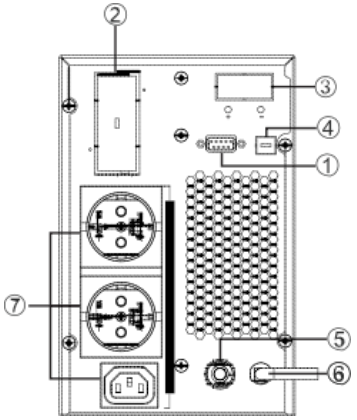
Type		Model	Remark
Standard	1kVA	ES+101	With a 1A internal charger and 2 built-in batteries of 12V/ 7AH –9 AH
	2kVA	ES+102	With a 1A internal charger and 4 built-in batteries of 12V/ 7AH -9AH
	3kVA	ES+103	With a 1A internal charger and 6 built-in batteries of 12V/ 7AH-9AH
Long Backup Time	1kVAS	ES+101S	With a 7A internal charger and external battery slot.
	2kVAS	ES+102S	With a 7A internal charger and external battery slot.
	3kVAS	ES+103S	With a 5.5A internal charger and external battery slot.

Type		Model	Input	Battery
Standard	6KVA	ES+106	Single phase + N	inbuilt
	10KVA	ES+110	Single phase + N	inbuilt
Long back up time	6KVAS	ES+106S	Single phase + N	External battery bank
	10KVAS	ES+110S	Single phase + N	External battery bank

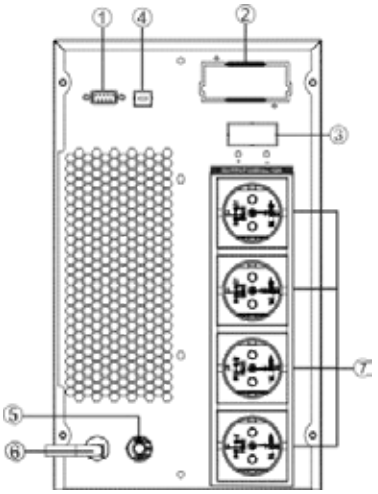
Note: "S" model means Long Backup Time.

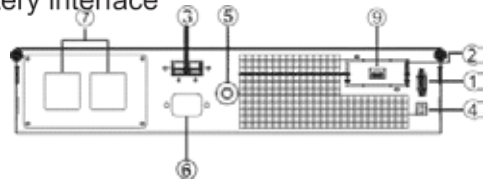
2.2 The Appearance of the UPS

Figure 2-1 The rear panelof ES+101/ES+102/ES+103



① Computer interface
② Smart slot (optional)
③ External battery connection (only available for L model)
④ USB (optional)
⑤ Input circuit breaker
⑥ AC input
⑦ Output receptacles
⑧ Output terminal
⑨ EPO (optional)
⑩ Battery interface





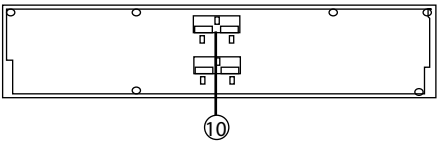
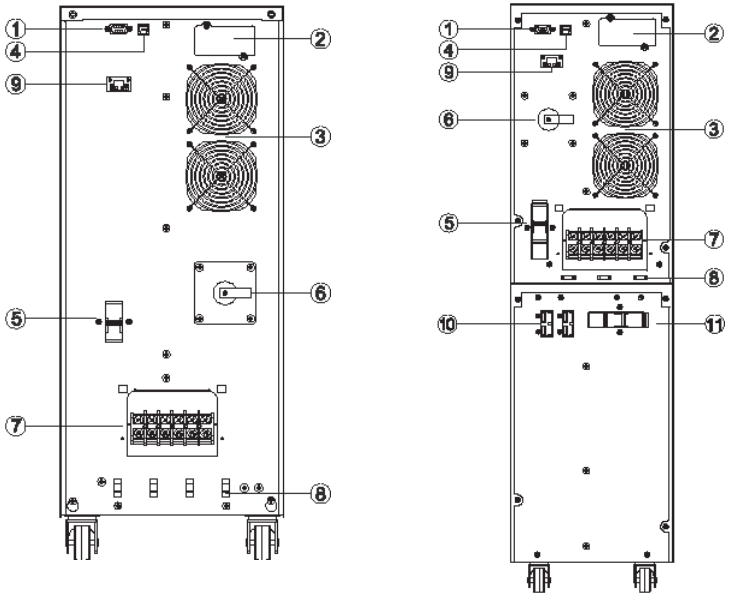


Figure 2-2 The rear panelof ES+102-ES103 RT

Rear Panel of ES+106/ES+110

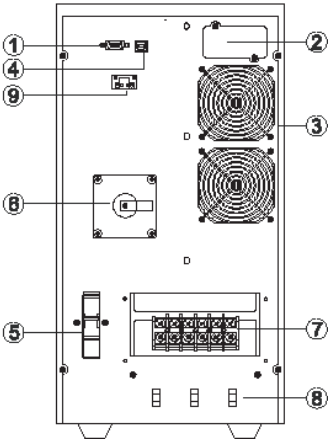


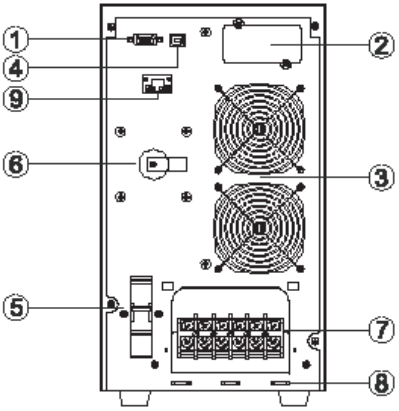
1-Computer interface
2- Smart slot (optional}
3- Fan
4- USB (optional}
5- Input protection switch
6- Maintenance switch (optional}
7- Terminal strip
8- Corbel
9- EPO
10- Battery interface
11- Battery protection switch

* The picture for back panel is just for reference, it subjects to change on customer's requirement, please refer to the real subject.

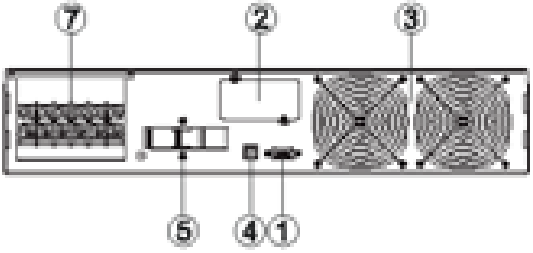
Note: *The appearances above are examples with the long backup time, the corresponding standard type is without the "External Battery slot".*

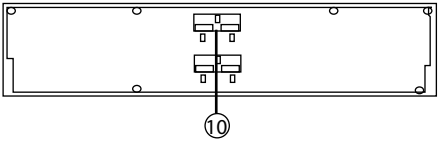
Rear Panel of
ES+106/ES+110
(Long Backup)





Rear Panel of ES+106ES+110S RT





* The picture for back panel is just for reference, it subjects to change on customer's requirement, please refer to the real subject.

2. 3 Operating Principle

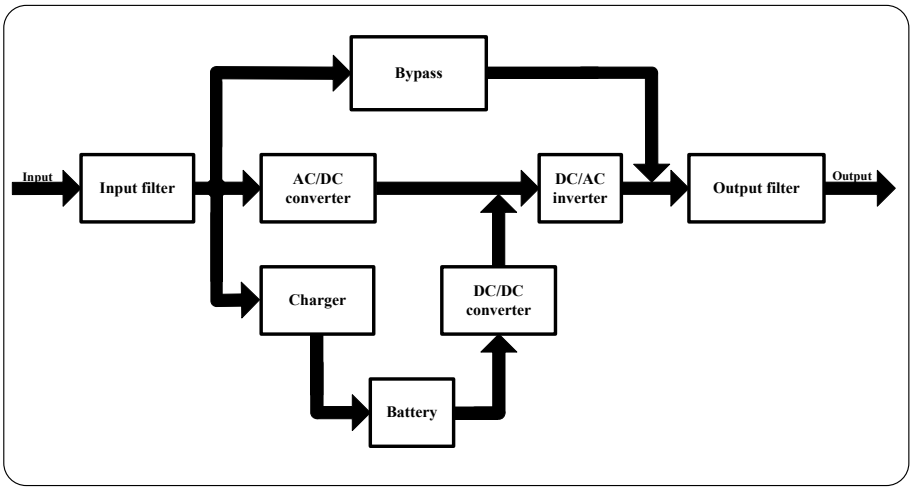


Figure 2-3 The UPS operating principle

1. Input filter: it filters the input and provides clean AC power to the UPS.
2. AC/DC converter: In Normal mode, it converts the AC input power to regulated DC power, and raises the regulated DC voltage for DC/AC converter.
3. DC/DC converter: Raises the DC Voltage from the battery system to the optimum operating voltage for the inverter when the UPS operates in Battery mode.
4. DC/AC inverter: In Normal mode, it utilizes the DC output of the AC/DC converter and inverts it into precise, regulated sine wave AC **power**. In Battery mode, it receives energy from the battery through the DC/DC converter.
5. Bypass: It is very important in the UPS system. In the event of a UPS fault that will not lead to UPS shutdown, the load will be automatically transferred to the bypass. Meanwhile, the LED indicators will indicate the fault type, and the fault information will be reported through the communication ports.
6. Charger: The charger of standard UPS provides 1A charging current; and long backup time provided 7A (3K is 5.5A) charging current.
7. Battery: Sealed maintenance-free lead –acid battery can be used as the DC source of the UPS.
8. Output filter: It filters the output and provides clean AC power to the load.

3. INSTALLATION

3.1 Unpacking and Inspection

3. 1.1 Unpacking and Inspection (for 1/2/3KVA)

1. Open the packing box of UPS and take it out, visually examine the unit for transit damage.
2. Check against the accessory lists that the accessories of the UPS are present. (Refer to Table 10-1).
3. Make sure the model is what you wanted from the nameplate on the rear panel
4. If the UPS arrives damaged, or there is any missing accessory or other question above, please contact the distributor immediately.

3.1.2 Unpacking and inspection (for 6/10KVA)

1) Unpack the packaging and check the package contents. The shipping package contains:
   - A UPS
   - A user manual
   - A communication cable
2) Inspect the appearance of the UPS to see if there is any damage during transportation. Do not turn on the unit and notify the carrier and dealer immediately if there is any damage or lacking of some parts.

3.2 Installation Notes

1. When locating the UPS, make sure there is no hazardous objects such as water, inflammable gas, corrosive agents and so on around the UPS, and that the installation environment meets the specifications.
2. The UPS should not be placed on a side. The air inlet port at the front panel and the outlet port on the rear panel and two side panels should not be blocked so as to ensure good ventilation.
3. In case if the UPS is unpacked, installed and used at very low temperatures, condensations of water drops may appear. It is necessary to wait until the UPS fully dried inside out before proceeding to installation and use. Otherwise, they may be a risk of electric shock.
4. Place the UPS near the utility power source outlet which supplies power to the UPS. In any emergency, switch off the main input socket, cut off the battery voltage input. All power sockets must be connected with ground protection.

3.2.1. Notes for installation (6/10KVA)

1) The UPS must be installed in a location with good ventilation, far away from water, inflammable gas and corrosive agents.
2) The UPS should not be tilted. The air inlet port at the lower part of the front panel and the fan outlet port on the rear panel should not be blocked so as to ensure good ventilation (Allow at least 0.5m of space on each side).
3) In case if the UPS is unpacked, installed and used at very low temperatures, condensation of water drops may appear. It is necessary to wait until the UPS is fully dried inside out before proceeding to installation and use. Otherwise, there may be a risk of electric shock.

3.2.2. Installation

Installation and wiring must be performed in accordance with the local electric code and the following instructions by professional personnel. For safety, please cut off the mains power breaker before installation. The battery breaker also needs to be cut off if it is a long backup time model.

1) Open the terminal block cover located on the rear panel of the UPS (please refer to the appearance diagram).
2) For 6K (S) UPS, it is recommended to select the UL1015 10AWG ($6mm^2$) wire or other insulated wire which complies with AWG Standard for the UPS input and output wirings.
3) For 10K (S) UPS, it is recommended to select the UL1015 8AWG (10mm2) wire or other insulated wire which complies with AWG Standard for the UPS input and output wirings.

Note: Do not use the wall receptacle as the input power source for the UPS, as its rated current is less than the UPS's maximum input current. Otherwise the receptacle may be burned and destroyed. (Please refer to section 1.4)

4) Connect the input and output wires to the corresponding input and output terminals according to the following diagram.

Note: you must make sure that the input and output wires and the input and output terminals are connected tightly.

5) The protective earth ground wire refers to the wire connection between the equipment which consumes electro-equipment and the ground wire. The wire diameter of protective earth ground wire should be at least as above mentioned for each model and green wire or green wire with yellow ribbon wire is used.

6) After having completed the installation, make sure the wiring is correct.
7) Please install the leak current protective breaker at the output power distribution panel of the UPS if necessary.
8) To connect the load with the UPS, please turn off all the loads first, then perform the connection and finally turn on the loads one by one.
9) No matter the UPS is connected to the utility power or not, the output of the UPS may have electricity. The parts inside the unit may still have hazardous voltage after turning off the UPS. To make the UPS have no output, power off the UPS, and then disconnect the utility power supply.
10) Suggest charging the batteries for 8 hours before use. After connection, turn the input breaker in the "ON" position, the UPS will charge the batteries automatically. You can also use the UPS immediately without charging the batteries first, but the backup time may be less than the standard value.
11) If it is necessary to connect the inductance load such as a monitor or a laser printer to the UPS, the start-up power should be used for calculating the capacity of the UPS, as its start-up power consumption is too big when it is started.

3.3 Cable Connection

3.3.1 Connecting Input and Output Cables

1. Input cable connection

If the UPS is connected via the power cable, please use a proper socket with over current protection, and pay attention to the capacity of the socket: over 10A for ES101(S), over 16A for ES102(S) and ES103(S). A side of input wiring has been fixed with the UPS, and the other side is just need to plug into the input socket. The wiring configuration is shown in the following diagram.

Figure 3-1 Connection Method of Input

2. Output cable connection

The output of ES01(S)/ ES102(S)/ ES103(S) all available to uses sockets. The total output power shall not exceed 1kVA/0.8kW, 2kVA/1.6 kW，3kVA/2.4 kW. Simply plug the load power cable to the output sockets of UPS to complete connection as shown in the following diagram.

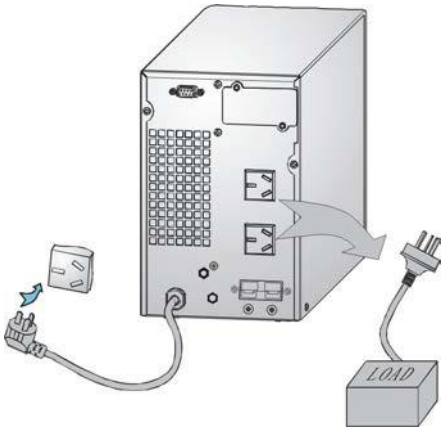


Figure 3-2 Connection method of output

3.3.2 Operation Procedure of External Battery for Long Backup Time UPS

The battery connection procedure is very important for long backup model. Any incompliance may result in the risk of electric shock. Therefore, the following steps must be strictly complied with.

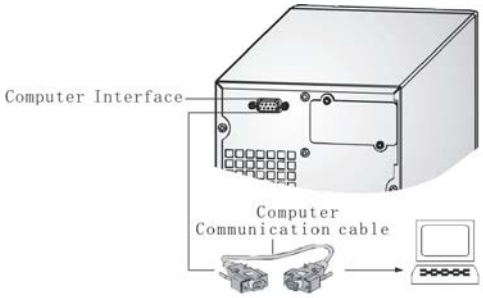
1. First connect in series the batteries of the pack to ensure proper battery voltage that ES101S for 24/36VDC, ES102S for 48/72VDC ES103S for 72/96VDC (
2. Take out the battery cable delivered with the UPS, one end of the external battery cable is a plug for connecting the UPS, the other end has 3 open wires for connecting the battery pack.
3. Connect the external battery cable to the battery terminal (DO NOT connect the battery socket of the UPS first. Otherwise, it may cause electric shock). Connect the red wire to the "+" terminal of the battery. The black wire is connected to the "-" terminal of the battery. The green/yellow wire is grounded for protection purpose.
4. Connect the plug of the external battery cable to the external battery slot on the rear panel of the UPS to complete the connection procedure.

Figure 3-3 Battery connection diagram for Long Backup time models

Note: *The length of the external battery cable is 1.6 m, If users need a longer one, please consult the distributor. There is a is a limit to the length of the external battery cable to ensure normal operation of the UPS.*

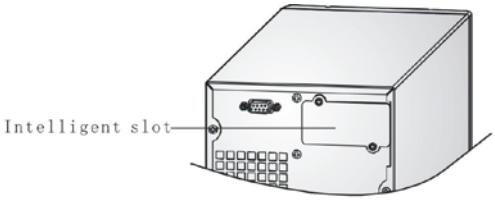
3.3.3 Connecting Communication Cable

1. Computer interface



Computer interface: The type of signals is provided by the UPS to communicate with a host computer through communication cable included in the standard accessory, User can use special monitor software UPSilon in the standard accessory to monitor the UPS through the port.

2. Alternative connection of communication



Intelligent Slot: It is designed for installing the dry contact card, SNMP card and 485 card. You can choose for one of them to installed

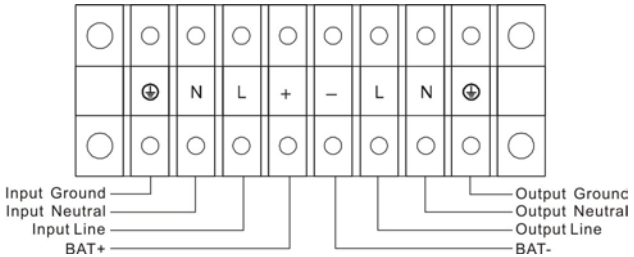
a－dry contact card: You can utilize monitor function of dry contact to manage the power supply directly.

b－SNMP: It enables you monitor the UPS remotely through Internet.

c－485: Central monitor card.

Note: *Please remove the cover board of the intelligent slot before any card is installed.*

Cable connection For 6/10 KVA UPS



Input and Output Terminal Block wiring diagram of 6K（S）、10K(S)

3.4 Operating procedure for connecting the long backup time model UPS with the external battery

3.4.1. The nominal DC voltage of external battery pack is 192VDC. Each battery pack consists of 16 pieces of 12V"maintenance-free" batteries in series. To achieve longer backup time, it is possible to connect multi-battery packs, but the principle of "same voltage, same type" should be strictly followed.

3.4.2 .For 6KS/10KS,The procedure of installing battery bank should be complied with strictly. Otherwise you may encounter the hazardous of electric shock.

1) A DC breaker must be connected between the battery pack and the UPS. The capacity of breaker must be not less than the data specified in the general specification as follow.

Model	6K	6KS	10K	10KS
Battery voltage	192VDC	192VDC	192VDC	192VDC
Battery current	34A max	34A max	56A max	56A max

Note: 240VDC battery voltage can be choose.

2) Set the battery pack breaker in "OFF" position and connect the 16 pieces of batteries in series.

3.4.3. To complete the connection by plugging the connector of the external battery cable into the external battery socket of the UPS. Do not attempt to connect any loads to the UPS now. You should connect the input power wire to the right position first. And then set the breaker of the battery pack in the "ON" position. After that set the input breaker in the "ON" position. The UPS begins to charge the battery packs at the time.

3.5 Parallel operation (6/10 KVA)

3.5.1. Brief introduction of the redundancy

N+X is currently the most reliable power supply structure. N represents the minimum UPS number that the total load needs; X represents the redundant UPS number, i.e. the fault UPS number that the system can handle simultaneously. The bigger the X is, the higher reliability of the power system is. For occasions where reliability is highly required, N+X is the optimal mode. As long as the UPS is equipped with parallel cables, up to 3 of them can be connected in parallel to realize output power sharing and power redundancy.

3.5.2. Parallel installation

1) Users need to opt a standard 25-pin communication cable, which should have 25 cores, corresponding stitches and shield, as the UPS parallel cable. The length of the parallel cable is appropriate to be less than 3 m.
2) Strictly follow the stand-alone wiring requirement to perform the input wiring of each UPS.
3) Connect the output wires of each UPS to an output breaker panel first, and then connect the wiring to the load via the breaker panel.
4) The parallel UPS must be equipped with battery individually.
5) Please refer the figure followed to see the wiring of parallel operation. The capacity of the breaker must be not less than the specification as follow.

Model No.	Capacity of breaker
6K(S)	≥40A/250VAC
10K(S)	≥60A/250VAC

* The requirement of the output wiring is as follows:

- When the distance between the UPSs in parallel and the breaker panel is less than 20 meters, the difference between the wires of input & output of the

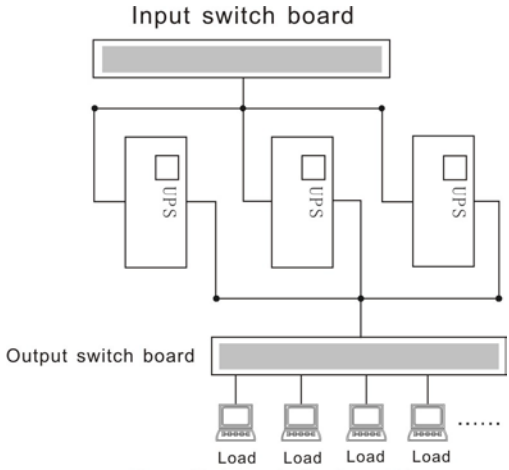
UPSs is required to be less than 20%;

- When the distance between the UPSs in parallel and the breaker panel is greater than 20 meters, the difference between the wires of input & output of the UPSs is required to be less than 10%.

3.5.3. Operation and maintenance

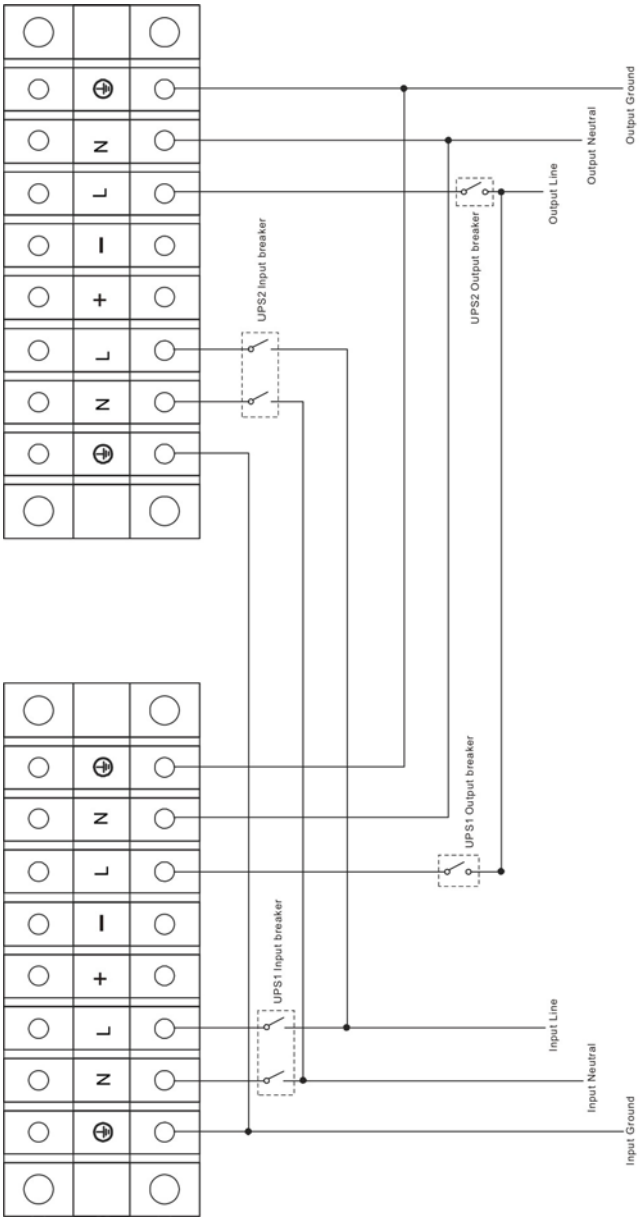
1) To perform the general operation, follow the stand-alone operating requirement;
2) Start up: The units transfer to INV mode simultaneously as they start up sequentially in utility power mode;

Shutdown: the units shut down sequentially in INV mode. When the last one completes the shutdown action, each unit will shut down the inverter simultaneously and transfer to bypass mode.



Parallel Installation Diagram

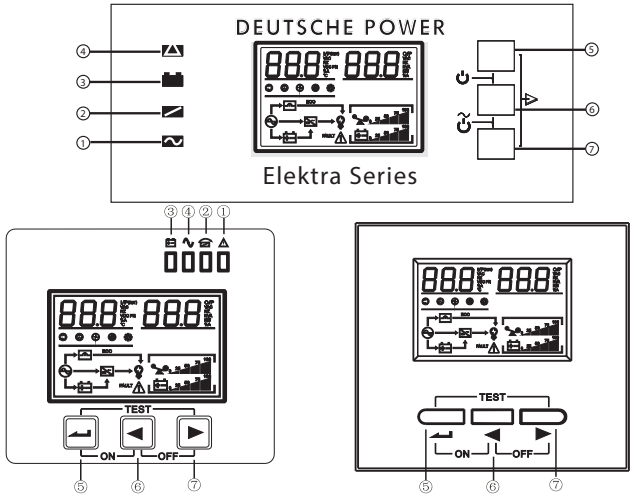
3) To perform the maintenance, follow the stand-alone requirement.



Parallel installation wiring diagram of 6K/10K

4. Operation

3.1 Panel display



Display	Function
Error message	
FAULT	Failure occurred
⚠	Warnings
88	Fault code
Mute	
	Mute function
Input and output voltage, DC voltage, UPS internal temperature	
888 VAC VDC °C	VAC: input and output voltage VDC: DC voltage °C : UPS internal temperature HZ : Frequency
Load information	
0 25 50 75 100	The load volume(0~25%,26%-50%,51%-75%,76%-100%) is shown here,and the overload icon flashes when overload.
Battery information	
0 25 50 75 100	The battery capacity(0~25%,26%-50%,51%-75%,76%-100%) is displayed separately, and the battery icon flashes when the battery is low or not connected.
Other information	
	AC
	BATTERY
	Bypass
	Inverter
	Output working
	Fan status: LED will always on when the fan is normal, and flashes when the fan is failure.
	Setting icon: when entering the setting menu, the icon will light up, and the icon does not show in the other cases.
	ECO function: Icon lights up when ECO function is used, otherwise the icon is not displayed.
	Maintenance icon: When the maintenance switch is turned on, the icon lights up. In other cases, the icon does not display.

3.2 LED indicator

① Fault indicator is RED: flashing when UPS alarm, and always on when fault.

② Bypass indicator is YELLOW: LED is continuous on when UPS working in bypass mode or ECO mode. When UPS working in standby mode, its frequency conversion do not turn on and bypass abnormal, LED flashes.

③ Battery indicator is YELLOW：LED is always on when UPS work in battery mode and battery self-test mode, LED flashes and UPS alarm when battery is low.

④ Inverter indicator is GREEN: LED is always on when UPS work in the inverter mode (such as: AC mode, battery mode, battery self-test mode, ECO mode, frequency conversion mode).

3.3 Function of button

Button	Functional Description
Combo key for turning on the UPS (↵ + ◀)	Electricity AC Mode: press these two start button groups at the same time and over 1 second to start UPS. Battery Mode: please press(↵)confirm button first, after turn on the screen, please press these two start button groups at the same time and over 1 second to start UPS.
Combo key for turning off the UPS (◀ + ▶)	Electricity AC Mode: press these two turn off button groups at the same time and over 1 second to turn off inverter output, system will change to bypass mode. Battery Mode: press these two turn off button groups at the same time and over 1 second to turn off inverter output, after 1 minute, system will shut down, and screen will turn off.
Combo key for self-checking and mute function (↵ + ▶)	Testing: in electricity AC mode,press these two testing/mute button groups at the same time and over 2 second, to test the battery. Mute: In battery mode/Alarm/testing mode, press two testing/mute button groups at the same time and over 2 second, to erase Alarm, press two testing/mute button groups again and over 2 second, to recover Alarm.
Function setting/confirmation key (↵)	Function setting: press the key more than 2 seconds to enter the function setting page, determine the options and press the key more than 2 seconds again to return to the main page. Confirmation: in the function setting page, press the confirmation key 1 sec to 2 secs to confirm the setting options.
Page turning/query key (◀ , ▶)	Page turning: Press ◀ or ▶ key 1 to 2 seconds to turn to left or right page Polling mode: press the ▶ key more than 2 seconds to enter polling mode, circularly display each page content for 2 seconds, press ▶ more than 2 seconds again to return to the main page.

4.2 Operation (LED model)

Beeping :

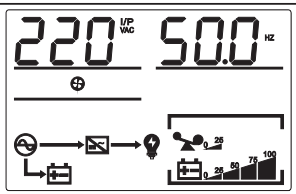
Beeping	Description
Continuous beeping	Fault mode
Beep every second	Battery low voltage in DC mode
	Overload
Beep every two minutes	Bypass mode
Beep every four seconds	Other beeping

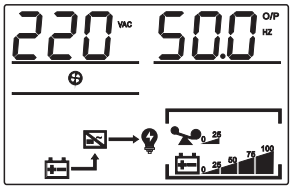
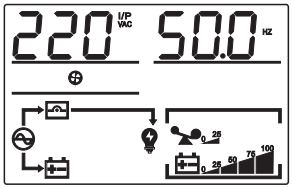
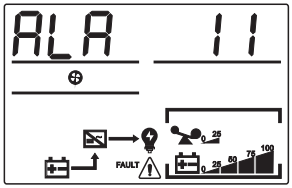
UPS working status table of LED indicator :

Working mode	Panel display				Beeping
	Inverter LED	Battery LED	Bypass LED	Fault LED	
AC mode					
Normal working	●				N/A
Warnings	●			★	Beep every second/Beep every four seconds
Battery mode					
Warnings except the battery low voltage	●	●		★	Beep every four seconds
Battery low voltage warning	●	★		★	Beep every second
Bypass mode					
Normal working			●		Beep every two minutes
Warnings			●	★	Beep every second/Beep every four seconds
ECO mode					
Normal working	●		●		N/A
Warnings	●		●	★	Beep every second/Beep every four seconds
Other mode					
Battery self-checking mode/ Boot process	★	★	★	★	Beep every four seconds
Fault mode				●	Continuous beeping

● Indicator continuous ON. ★ Indicator flashing.

3.5 UPS working status table of LCD display

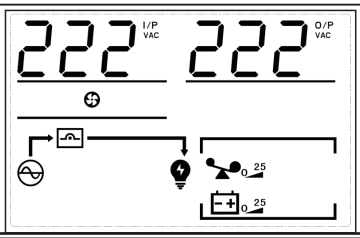
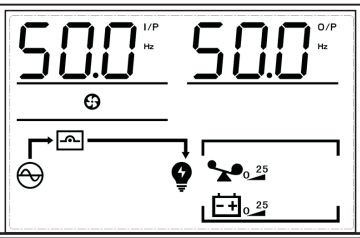
AC mode	
LCD display content	Instruction
	UPS can provide stable AC output when AC input in the permissible range. In the AC mode, battery will also be charged by the UPS.

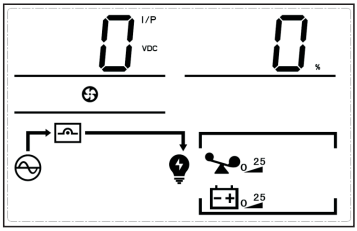
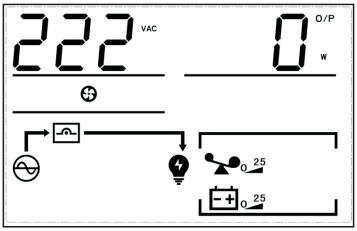
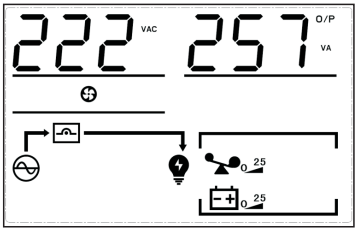
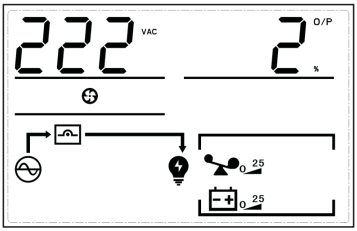
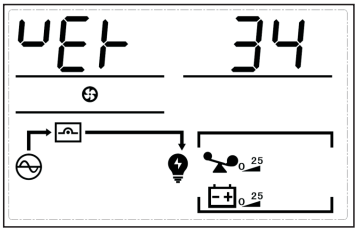
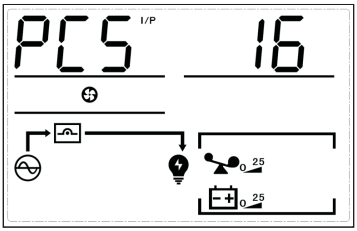
Battery Mode	
LCD display content	Instruction
	When the AC input is out of limited range or shut off, the UPS will turn to the battery mode. The batteries support output loading and will have beep every 4 seconds.
Bypass Mode	
LCD display content	Instruction
	When the AC input keeps normal, start the bypass mode and UPS closed. The UPS will turn to the bypass mode, and have beep every 2 mins.
Error Condition	
LCD display content	Instruction
	When the UPS have fault, LCD display will show the fault information.

3.6 Parameter query

Normally the LCD display can show 8 pages totally. Press the query bottom ◄ or ► for 0.1~2 sec can change to the different pages which shown all information, such as input, battery, output, loading, software version, temperature, and etc. If there have alarm condition, display will add 1 more page to show the alarm information. If the UPS have fault, the default display will turn to the Fault code page automatically. The home page default display will show the fault or alarm information. When UPS keeps normal working, the home page default display will show the output voltage and frequency information.

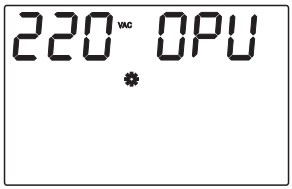
Press ► (right botton) more than 2 sec, LCD will turn to the polling mode. Every 2 sec the shown display will turn page. Press ► long time, LCD will turn out of the polling mode.

LCD Display 1: UPS input & output voltage	LCD Display 2: UPS input & output frequency
	

LCD Display 3: Battery voltage and capacity	LCD Display 4: Output voltage and Output active power
	
LCD Display 5: Output voltage and output complex power	LCD Display 6: Output voltage and load percentage
	
LCD Display 7: UPS system software version	LCD Display 8: connected battery quantity
	

3.7 Function setting

●01: Output Voltage

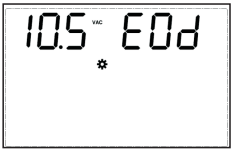
LCD Display	Setting
	**1**. Press the function setting button (⏎)over 2 sec, then go to the setting page. Press the page-turning buttons till the setting page of output voltage, and the words "**OPU**" flashing. **2**. Press confirm button (⏎)0.5~2 sec, then go to the setting page of Output voltage **OPU**. The "**OPU**" words light on, and the the numbers by the left side of **OPU** keeps flashing. Press page-turning buttons (◄) or (►) 0.5~2 sec, choose different output voltage value. The optional voltage value are 208V, 220V, 230V, and 240V. The by default output voltage is 220V. Please save after setting. **3.** Turn to the voltage value which you need, and press confirm button(⏎) 0.5~2 sec, then finish the **OPU** setting. The number by left side of OPU will keep light on, no flashing. **4**. Press functional setting button (⏎) over 2 sec, quit the setting page and back to the home page. (Or no operation, waiting more than 30 sec., the page will come back to home page automatically) **Note**: When the output voltage setting with 208V, the output needs to decrease related to 90%.

●02: Other functional setting

02-1: Expert Mode (EP)

LCD Display	Setting
 	The Expert Mode setting with ON, then go to the functional setting page again. The functional setting will show battery QTY (PCS), EPO, charging current and other items can be chosen. When the Expert Mode setting with OFF, functional setting page will show only the general options. Note: The Expert Mode default to OFF. When setting as ON then re-connected the AC power, the EP can be recovered as OFF.

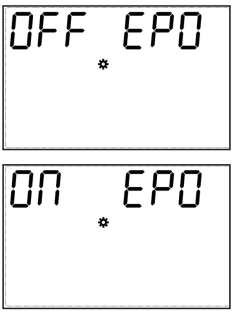
02-2: Battery Low voltage shutdown point/ End of Discharge voltage (EOD)

LCD Display	Setting
 	The options of EOD setting are dEF, 9.8V, 9.9V, 10V, 10.2V, 10.5V. By default, the EOD is dEF (The EOD will be changed according to loading condition. 10.5V@ Loading<25%, 10.2V@ 25%< Loading< 50%, 10V@ Loading >50%)

02-3: Economic Operation Mode (ECO)

LCD Display	Setting
 	ECO is OFF by default, can be set as ON to improve the efficiency of system operation. Note: For the models with PF<1, OFF by default, and unable to set.

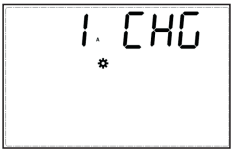
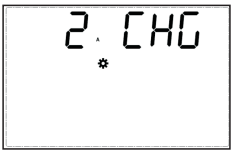
02-4:Emergency shut down(EPO)

LCD Display	Setting
	When EP is set to ON, the EPO option appears on the function Settings page,emergency shutdowns can be set.Emergency shutdown function default that plug EPO terminal valid (OFF), can choose to plug EPO terminal valid (ON). Note: After EPO action, emergency shutdown, close all outputs immediately.

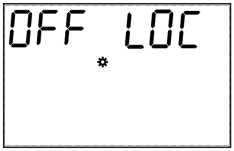
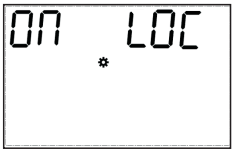
02-5:Battery quantity(PCS)

LCD Display	Setting
 	When EP is set to ON, the PCS option appears on the function Settings page, will enter the password page, enter the password (the general password is 135), you can set the number of batteries.The battery number system defaults to 16pcs, which can be set to 16/18/20pcs.

02-6:Charger Current(CHG)

LCD Display	Setting
 	When EP is set to ON, the CHG option appears on the function Settings page,charger current can be set,1-12A optional, default 1A ; Noted:If UPS bulit-in batteries, the charger current default 1A, and can't be change.

02-7：Input Neutral and Live cable reverse alarm function

LCD Display	Setting
 	Input Neutral and Live cable reverse alarm mode closed by default, can choose to open to improve the safety of the system. Notice： Factory settings default closed, please open if you need.

4.Warning code/fault code and solution

4.1 Warning code and solution

When the "⚠" symbol on the UPS LCD flashes, the UPS is in alarm state. Press the page turn key to the error state page (refer to 3.5), observe the alarm code and make appropriate processing according to the table below.

Alarm Code	Indication	Possible reasons	Treatment measure
1	No battery connection	1.Do not connect with battery 2.Battery damage	1.Check the connection of battery. 2.Change the battery
2	Battery low voltage	The battery voltage is less than the low voltage warning point. The battery discharge is below the alarm point.	After the battery has been set for a period of time, it can be turned on again. The built-in charger can be turned on to charge the battery
4	Input Neutral and Live cable is reversed.	1.Input Neutral and Live cable is reversed. 2.Input ground cable is not connected. 3. Output ground cable is not connected.	1.Reverse the Neutral and Live cable. 2. Input+B3:C14output ground cable ensures good connection.
8	Battery over voltage	UPS detects high battery voltage	Check that the battery quantity setting is consistent with the actual battery quantity.
9	Charger failure	Abnormal charger hardware	Contact with supplier
10	Over temperature alarm	1.Fan fault 2.Air duct of UPS rear panel is blocked. 3.Overload 4.NTChardware abnormal or connection abnormal 5.Power device IGBT is damaged	1.Check the rectifier fan 2.Remove UPS back plate obstruction 3.Check the load 4.If the above treatment cannot be solved, contact the supplier
12	Fan fault	1.Fan wiring is loose 2.Fan hardware abnormal	Check the fan and connection
13	AC fuse open	Fuse blown	Contact with supplier
14	EEPROM fault	EEPROM Chip damage	Contact with supplier
21	Over-load	The load exceed rated power	Check the load
22	3 times consecutive overload locks	3 times consecutive overload locks	Shut down and restart UPS
23	EPO action	Press EPO button	1. Release EPO button 2.Check the wiring harness on EPO button
24	Maintenance switch action	The maintenance switch is pressed	Release maintenance switch

4.2 Fault code and solution

When the **"FAULT"** is long bright, and "⚠" symbol on the UPS LCD flashes, the UPS is in fault state.UPS automatically switches to the error status page (refer to 3.5) to observe the fault code and make appropriate processing according to the following table.

Fault code	Indication	Possible reasons	Treatment measure
1	Bus boosting soft start fail	1.AC abnormal 2.Abnormal soft-starting circuit of bus	Check the Main, if all normal please contact with supplier
2	Bus over voltage	1.AC abnormal 2.Software processing error 3.BUS capacitance fault	Check the Main, if all normal please contact with supplier

Fault code	Indication	Possible reasons	Treatment measure
3	Bus under voltage	1. city electricity is too low 2. software processing errors 3.BUS capacitor failure	Please check the city electricity, if no any abnormal, please contact supplier
7	Over temperature	1. Fan failure 2.The air duct on the rear panel of the UPS is blocked 3. Overload 4. NTC hardware abnormality or abnormal wiring 5. Power device IGBT damaged	1.Please check the rectifier on the fan; 2. Clean the obstacles on the air duct of the rear panel of the UPS; 3. check the loads; 4. if all of above can not be solved, please contact supplier;
8	Battery relay short circuit	Relay RL1/RL3 hardware damaged	please contact supplier
9	Bus relay soft start fail	1.city electricity is abnormal 2.Busbar starts and loop in abnormal	Please check the city electricity, if no any abnormal, please contact supplier;
17	Inv soft start fail	1.Some hardware of Inverter is damaged; 2.Control panel is failure	please contact supplier
18	Inv output over voltage	1.Some hardware of Inverter is damaged; 2.Control panel is failure	please contact supplier
19	Inv output under voltage	1.Some hardware of Inverter is damaged; 2.Control panel is failure	please contact supplier
20	Inv short circuit	1.Some hardware of Inverter is damaged; 2.Output short circuit	1. Check if short circuit caused on the output of UPS 2. Check if the loads is short circuit 3.if no any abnormal, please contact supplier
26	Negative power protection (output with AC input fail)	1. Bypass reverse to the inverter 2. Overload abnorma	Check the loads and if no any abnormal, please contact supplier;
33	Inv relay or SCR open circuit	Relay RL8 is damaged	please contact supplier
34	Inv relay or SCR short circuit		
35	Bypass relay or SCR open circuit	Relay RL4/RL6 is damaged	please contact supplier
36	Bypass relay or SCR short circuit		
37	I/O connection reversed	Reverse wiring on input and output	Please check the wiring harness of input and output
39	Charger short circuit	1.output of Charger short circuit 2.Charger hardware abnormal	please contact supplier
66	Over load fault	1.overload too much 2.The voltage reduction causes the system rated power to decrease	1. Check if the load is within the specified range 2Check if the pressure has been reduced
67	Charging over voltage or battery connection reversed	1.Hardware error 2.Number of Battery wrong 3.Wiring wrong	1. Check whether the battery wiring or battery number meets the requirements 2.if no any abnormal, please contact supplier
68	Unknown machine model	Software version error	1.Restart machine; 2.if no any abnormal, please contact supplier;
72	Charger over current	1.Hardware error 2.Battery abnormal	1.Check whether the battery wiring or battery number meets the requirements 2.if no any abnormal, please contact supplier;
73	No bootstrap	Software version error	1.Restart machine; 2.if no any abnormal, please contact supplier;

Fault code	Indication	Possible reasons	Treatment measure
81	Unknown battery QTY setting	Number of Battery wrong	1.Check whether the battery number meets the requirements 2.Check if the configuration of the battery jumper cap is the same as the software setting
82	Battery QTY setting matching error	Number of Battery setting wrong and can not be matched with software setting	

4.3 Common faults and trouble shooting

Number	Problem or errors Description	Reason	Solution
1	Connect to city electricity, and no display on LCD display panel	No Input power	Check if the input wiring harness of UPS is in well connection
		Input voltage under voltage or overload	Use voltage meter to check the input voltage if in normal or meets the requirements
2	City electricity in normal, no AC current Input indicator, UPS is still working in battery mode	UPS power switch is still off	Press UPS city electricity power switch on
		The wiring harness is loosen or in poor connection	Check the input wiring harness if in normal
3	UPS no display error, but no output voltage	The wiring harness is loosen or in poor connection	Make sure the wiring harness in well connection
4	Press ↵ button, UPS did not start	Press button to shortly	Press ↵ over 5 seconds, hear “Di” sound
		overloads	Remove all loads and restart machine
5	With City electricity, but no City electricity indicator	Mains voltage or frequency over UPS input range	Use a multimeter to check the input voltage, whether the input frequency meets the requirement
6	The battery discharge time is lower than the standard time	The power of battery has been used	Change new battery
		The battery did not charge in full	Charge the battery more than 8 hours under normal city electricity,then retest it
7	Abnormal sound or smell come out from the inside of UPS	Inner of UPS may be damaged	Please immediately turn off the UPS, cut off the power input, and contact the customer service center for technical support
8	Battery mode display yellow light, long buzzer sounds, battery capacity is insufficient, ready to shut down	The power of battery is low, UPS is ready to shut down, and the loads will be cut off	1. Save the data on the loads immediately and complete shutdown the important loads to avoid data loss or damage. 2. Immediately connect the UPS input terminal to the standby AC power supply

5.Battery Maintenance & Repair

- This series of UPS only needs very little maintenance.The batteries of the standard machine are seal type and no need to maintain frequently. But also keep charging to get the excepted battery life.UPS keep charging when it is connecting to AC,no matter on/off.And if also have function of over charging and overload protection.

- If you don't use UPS for a long time,you should charge the UPS every 4-6 months.In the areas of high temperature, battery should be charging and discharging every two months ,the charging time should not be less than 12 hours.

- In normal circumstances, service life of the battery is 3-5years ， If the battery is found to be in poor condition, it must be replaced in advance.When replacing the battery, it must be done by a professional.

- When replacing the battery, follow the principle of quantity Model consistent and model Model consistent.

- The battery should not be replaced individually and when it replaced as a whole should be according to the battery supplier's instructions.

- In normal circumstances(under the condition of UPS with little back up power),the battery should be charged and discharged every 4-6 months.Keep discharging before UPS shut down then keep charging. the standard machine charging time should not less than 12 hours.

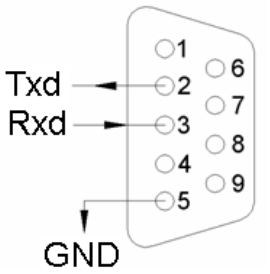
Product are subject to change without notice.

6. Internet and cable connections

This series is equipped with an intelligent slot for Web power (optional accessory) or other optional card to achieve remote management of the UPS. Please contact your local distributor for further information.

Description of communication interface

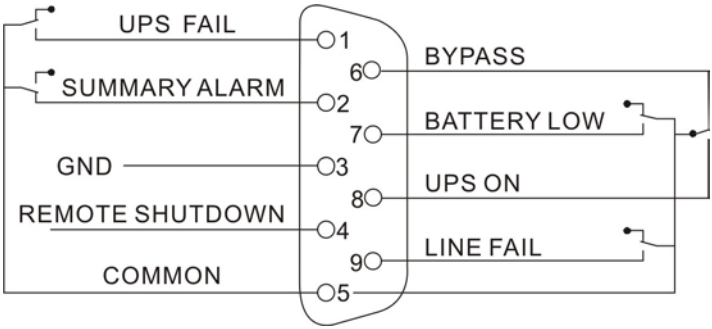
1) The standard RS232 port is applicable to communicate with computer.
Description and pin assignment of RS232
Baud rate: 2400bps
Data bit: 8 bit
Ending bit: 1bit
Parity bit: None
DB-9 pin assignment:



RS232 Interface

Pin number	Function description	I/O
3	Rxd	Input
2	Txd	Output
5	GND	Ground

2) User enables to monitor and manage the UPS through installed the AS400 card (optional).
PIN1: UPS failure (normally open, active close)
PIN2: summary alarm
PIN3: ground
PIN4: Remote shutdown
PIN5: Common
PIN6: Bypass active (relay close)
PIN7: Battery low
PIN8: UPS On (relay close)
PIN9: Utility Power failure (normally open, active close)



AS400 Interface

- This series UPS only requires minimal maintenance. The battery used for standard models is valve regulated sealed lead-acid maintenance free battery. These models require minimal repairs. The only requirement is to charge the UPS regularly in order to maximize the expected life of the battery. When being connected to the utility power, whether the UPS is turned on or not, the UPS keeps charging the batteries and also offers the protective function of overcharging and over discharging.

- The UPS should be charged once every 4 to 6 months if it has not been used for a long time. In the regions of hot climates, the battery should be charged and discharged every 2 months. The standard charging time should be at least 12 hours.

- Under normal conditions, the battery life lasts 3 to 5 years. In case if the battery is found not in good condition, earlier replacement should be made. Battery replace event should be performed by qualified personnel.

- Replace batteries with the same number and same type of batteries.

- Keep the ambient temperature between 15℃ and 25℃

- Do not replace the battery individually. All the batteries should be replaced at the same time following the instructions of the battery supplier.

- Normally, the batteries should be charged and discharged once every 4 to 6 months. Charging should begin after the UPS shuts down automatically in the course of discharging, the standard charging time for the standard UPS should be at least 12 hours. Discharge the battery with the load more than 50%.

MODEL		6K	6KL	10K	10KL
Rate Capacity	1.0	6KVA/6KW		10KVA/10KW	
INPUT					
Input formats		L+N+PE			
Rated input voltage		208/220/230/240VAC			
Voltage range		110~300VAC,110~176VAC,276~300VAC(power limited)			
Frequency range		50/60±6Hz(Default), ±10HZ(Adjustable)			
Input power factor		≧0.99			
Input Harmonic distortion		≦5% THD(linear load), ≦8% THD(non-linear load)(PF=0.8)			
OUTPUT					
Output formats		L+N+PE			
Output voltage		208/220/230/240VAC			
Output accuracy		±1%			
Output frequency		Online mode:according to AC frequency ,Battery mode:50/60Hz±0.1%			
Output Harmonic distortion		≦2% THD(linear load), ≦5% THD(non-linear load)(PF=0.8)			
Output Power Factor					
Switching Time		0ms,ECO Mode to Battery Mode 2ms			
Load Capacity		AC Mode: 30min@102%~110% Load 10min@110%~130% Load 30s@130%~150% Load 500ms@>150% Load		Battery Mode: 10min@102%~110% Load 1min@110%~130% Load 10s@130%~150% Load 500ms@>150% Load	
Machine Efficiency					
AC Mode		Maximum efficiency 95.5%, Full load effciency 95%			
Battery Mode		Maximum efficiency 95.3%, Full load effciency 94.8%(20pcs batteries)			
Charger					
Battery Type		Lead acid battery			
Battery Quantity					
Charging Current					
Charging Mode		Two/Three Period Charging			
Ambient Parameters					
Working ambient temperature		0~40℃			
Working ambient humidity		20%~95%（No Condensation）			
Storage temperature		-15~60℃(Battery:0~40℃)			
Altitude		<1000m,Derating at above 1000m,maximum 4000m,Refer to IEC62040			
Noise level		<50dB			

9.1 EMC

Item	Standard	Level
ESD	IEC61000-4-2	LEVEL4
RS	IEC61000-4-3	LEVEL3
EFT	IEC61000-4-4	LEVEL4
Surge	IEC61000-4-5	LEVEL4

1. All products are manufactured and tested to comply with the limits of CNS-13438 Class B standard.
2. All products are manufactured and tested to comply with the following EMC standards:

FOR 1/2/3 KVA UPS products comply with:

EN50081-1 / EN55022 Class B
EN50082-1 / IEC801-2 LEVEL 4
IEC801-3 LEVEL 3
IEC801-4 LEVEL 4
IEC801-5 LEVEL 2

(1) 1000VA, 2000VA, and 3000VA (220V -version) products comply with:
FCC Part 15 Class A
IEEE587 Class A

(2) The products of 3000VA (220V -version) are Class A digital devices.

FOR 6K/10K/15K UPS products comply with:

EN62040-1-1 (Safety)
Conducted Emission: EN50091-2: Limits for UPS which have a r ated output current exceeding 25A (25~100A)
Radiated Emission: EN50091-2: Limits for UPS which have a rated output current exceeding 25A (25~100A)
EMSEN61000-4-2(ESD)……..Level 4
EN61000-4-3(RS)…….Level 3
EN61000-4-4(EFT)……..…….Level 4
EN61000-4-5(Lightning Surge)……..Level 4
EN61000-2-2 (Immunity to low frequency signal)

9.2 Safety

Comply with GB4943-2001, IEC62040-1 and CE requirements.

9.3 Industry Standard

Comply with EN62040，YD/T 1095-2000 requirements.

WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed in accordance with the manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

10. APPENDIX

Consignment Lists

Model Type	Accessories	No.
Standard Model	Machine	1
	Intelligent monitor software CD	1
	User Manual	1
	Serial communication cable	1
Long backup time Model	Machine	1
	Intelligent monitor software CD	1
	User Manual	1
	External Battery Cable	1
	Serial communication cable	1

1.3 Specification

MODEL		1K	1KL	2K	2KL	3K	3KL	
Rate Capacity		1KVA/1KW		2KVA/2KW		3KVA/3KW		
INPUT								
Input formats		L+N+PE						
Rated input voltage		208/220/230/240VAC						
Voltage range		110~300VAC,110~176VAC,280~300VAC(power limited)						
Frequency range		50/60±6Hz (default),±10Hz(Settable)						
Input power factor		≧0.99						
Input Harmonic distortion		≦3% THD(linear load),≦5% THD(non-linear load) (PF=0.8)						
OUTPUT								
Output formats		L+N+PE						
Output voltage		208/220/230/240VAC						
Output accuracy		±1%						
Output frequency		Online mode:according to AC frequency ,Battery mode:50/60Hz±0.1%						
Output Harmonic distortion		≦1% THD(linear load),≦3% THD(non-linear load)						
Output Power Factor		1						0.8
Switching Time		AC Mode to Battery Mode 0ms , Inverter to Bypass 4ms(Typical)						
Load Capacity		AC Mode: 30min@102%~110% Load 10min@110%~130% Load 30s@130%~150% Load 200ms@>150% Load				Battery Mode: 1min@102%~110% Load 10s@110%~130% Load 3s@130%~150% Load 200ms@>150% Load		
Machine Efficiency								
AC Mode		Full load efficiency94.5%@220VAC		Full load efficiency95.5%@220VAC		Full load efficiency95.5%@220VAC		
Battery Mode		Full load efficiency89.5%@36VAC		Full load efficiency91.5%@72VAC		Full load efficiency91.5%@96VAC		
Battery Mode		Full load efficiency89.5%@24VAC		Full load efficiency91.5%@48VAC		Full load efficiency91.5%@72VAC		
Charger								
Battery Type		Lead acid battery						
Battery Quantity		7Ah x2	36V	7Ah x4	72V	7Ah x6	96V	9Ah x4
Charging Current		1K,2K.3K:1.0A(default),1~2A(Settable)External battery pack; 1KL,2KL.3KL:5.0A(default),1~12A(Settable).						
Charging Mode		Two/Three Period Charging						
Ambient Parameters								
Working ambient temperature		0~40℃						
Working ambient humidity		20%~95% (No Condensation)						
Storage temperature		-15~60℃(Battery:0~40℃)						
Altitude		<1000m,Derating at above 1000m,maximum4000m,Refer to IEC62040						
Noise level		<50db						
Gross weight (kg)	Standard case	9	5	17	9	21.4	9	——
	Small case	8.5	4.5	15	8	23.2	8	16.5
Machine size (mm)	Standard case	345*144*225		395*190*325		395*190*325		——
	Small case	285*144*225		395*144*225		460*190*335	395*144*225	395*144*225
Communication Interface								
Interface		One USB, one RS232, one EPO						
Standard and Approvals		EN/IEC 61000,EN/IEC62040,GB/T 7260,GB/T 4943,YD/T 1095,TLCetc.						

Connector	
Connector Type	Rs232,Extensible SNMP CARD,USB,Dry-contact card,EPO connector,Maintainance Connector.
Standard and Approvals	
EN/IEC 61000,EN/IEC 62040,GB/T 7260,GB/T 4943,YD/T1095,TLC etc.	

Load at altitude = Rated Power x Derating factor(Altitude corresponding)

Altitude(m)									
Derating factor									

⚠ Notice:If the machine is used at above 1000m,Diminishing ratings output must be used,please refer to above table for derating factor.

Because UPS model's parameters is different, so the product weight is different, please according to the physical object. If necessary, please consult with the sales.

Connector	
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